DOCUMENT RESUME

ED 161 880 TM 007 141

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TITLE The Discrepancy Evaluation Model: A Strategy for Improving a Simulation and Determining Effectiveness.
PUB DATE Mar 78
NOTE 26p.; Paper presented at the Annual Meeting of the American Educational Research Association (62nd, Toronto, Ontario, Canada, March 27-31, 1978)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Educational Assessment; Educational Change; *Educational Games; Evaluation Criteria; *Evaluation Methods; *Input Output; *Input Output Analysis; Models; Objectives; Rating Scales; Research Design; *Simulation; *Standards; *Summative Evaluation; Validity
IDENTIFIERS *Discrepancy Evaluation Model

ABSTRACT

This paper presents the Discrepancy Evaluation Model (DEM) as an overall strategy or framework for both the improvement and assessment of effectiveness of simulation/games. While application of the evaluation model to simulation/games rather than educational programs requires modification of the model, its critical features remain. These include: (1) the comparison of a standard to performance and identification and resolution of discrepancy information; (2) the recognition of evaluation stages which encompass planning, implementation, monitoring and assessment functions; (3) the concept of stage recycling; and (4) the development of a design and evaluation plan for each stage. Discrepancy information is important in each of four evaluation stages: pre design, design, input/process, and output. Each stage requires the comparison of standards to performance, that is, a discrepancy analysis. Borrowing from systems analysis concepts, standards are operationally defined as input (resources), process (activities), and output (objectives). An evaluation plan is also developed for each stage to raise evaluation concerns, formulate questions, select measurement instruments, and specify the criterion for satisfactory performance. The appendix includes two measurement instruments. The first is a guide to classifying simulations, and assessing the advantages and disadvantages of the selected format against the developer's objectives. The second is a ten-item rating scale incorporating eight concepts which the literature indicates are important in determining the face validity of a simulation. (Author/CP)

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The Discrepancy Evaluation Model: A Strategy for Improving a Simulation and Determining Effectiveness

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ED161880

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PRINTED IN U.S.A.

INTRODUCTION

The field of simulation/gaming has grown in recent years at a staggering rate. The time has arrived where multiple volumes are needed merely to catalogue and abstract the available materials. We, at this Special Interest Group on Simulation Systems at AERA, are illustrative of the interest in the field. This session is indicative of the increasing concern with the evaluation of simulation/games and the increasing sophistication and rigor that is being brought to such efforts.

The purpose of this paper is to present the Discrepancy Evaluation Model (DEM) as an overall strategy or framework for both the improvement and assessment of effectiveness of simulation/games. The DEM was developed by Provus (1971) as a formative and summative program evaluation model. (See also Yavorsky, no date, for explanation of discrepancy evaluation). While its application to simulation/gaming rather than educational programs requires modification of the model, its critical features remain. These include (1) the comparison of a standard to performance and identification and resolution of discrepancy information, (2) the recognition of evaluation stages which encompass planning, implementation, monitoring and assessment functions, (3) the concept of stage recycling, and (4) the development of a design and evaluation plan for each stage. This paper describes the DEM framework and provides an illustration of its application to the evaluation of simulation/gaming.

The paper does rest on certain assumptions. These are:

- Evaluation is a constructive activity. Information must be collected to improve a simulation/game before valid information can be collected to assess effectiveness.

- As discussed by Thorson (1977), the effectiveness of a simulation/game must be presented in terms of both the simulation/game itself and its use.
- Simulation/games are amenable to evaluation. Anticipated outcomes can and should be specified; unanticipated outcomes of a simulation/game should identified where possible after the fact.
- Evaluation calls for the use of both direct and unobtrusive measurement strategies. Specific measures will vary according to the type of simulation and objectives of the simulation.

The paper also restricts discussion to simulations/games which are to be used as instructional devices.

AN OVERVIEW OF DISCREPANCY EVALUATION FOR SIMULATION/GAMING

Discrepancy Information

A critical feature of discrepancy evaluation is the development of a standard(s). The standard reflects what should be; it can be considered a specific statement of intent or expectation. Standards can be derived from experience, knowledge, and values. For example, a standard may specify a particular change in attitude (e.g. towards programs for the gifted) as a desirable outcome of a simulation/game and consider a change in student's knowledge about gifted programs irrelevant. In discrepancy evaluation, standards are compared to performance (P). In other words, what is is compared to what should be. If a difference is found between the standard and performance, the difference is known as a discrepancy (D). Discrepancies may be positive, that is, the performance exceeds the standard and such discrepancies are usually

welcomed. However, negative discrepancies, those in which performance is poorer than the standard, require action of some kind. Typically, three alternative actions may be taken. First, an unrealistic standard may be reformulated. It may be decided, for example, that a standard of change in knowledge scores about economics was set too high and the change standard may be decreased. Second, greater control may be exerted over performance. For example, the simulation developer may revise those portions of the simulation which were to provide knowledge about economics and try the simulation again, keeping the standards identical to the first administration. The third alternative is to terminate the simulation -- either its development or its administration, depending on the stage. These three alternatives are displayed in Figure 1.

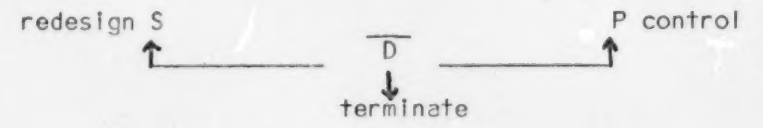

Figure 1

Evaluation Stages

Discrepancy information in relation to simulation/gaming is important in each of 4 evaluation stages. These evaluation stages are as follows:

A. Pre-Design Evaluation

B. Design Evaluation

C. Input/Process Evaluation

D. Output Evaluation

Each type of evaluation requires a standard which is to be compared to performance.

As each evaluation stage is discussed in detail later in the paper, this overview section briefly describes each stage. Basically, the first first stage or pre-design evaluation seeks to determine the appropriateness of simulation/gaming as a method of instruction in a given situation. Design evaluation, the second stage, seeks to determine both that the appropriate type of simulation has been chosen, and that the developed simulation has face validity. Input/Process evaluation examines the situation in which the simulation is being administered. In this third stage, the administration of the simulation/game is checked in order to determine whether the simulation has been installed as planned, and the on-going simulation/game is observed in order to monitor the sequential accomplishment of enabling objectives (sub-objectives which "enable" the achievement of the major goals of the simulation/game). Finally, in the product evaluation stage, summative evaluation becomes appropriate. In this fourth stage, the simulation/game is assessed in terms of the degree to which the terminal objectives of the simulation/game have been met. It is in this stage that quasi-experimental designs may be appropriate.

Development of the Standard and Evaluation Plan

For each evaluation stage, a standard and an evaluation plan are developed. The standard may borrow many concepts from systems analysis. As a blueprint or operational map of intent, it shows what's going to be done (activities), what will result if its done (objectives), and what's needed to do it (resources). Thus, there are input standards (resources), process standards (activities), and output standards (goals or objectives).

The evaluation plan selects and defines those areas which will be subject to evaluation. An evaluation plan identifies areas of evaluation concern,

formulates evaluation questions, identifies measurement devices, plans their administration, and gives the criterion.

The rigor with which the standards and evaluation plans are developed will depend on the seriousness of the evaluator's intent. Obviously, for example, an evaluation conducted for a simulation developer's own information will be more informal than that conducted for an simulation/game intended for commercial publication.

The Evaluation Cycle

The Evaluation Cycle depicted in Figure 2 shows that the Standard and Evaluation Plans are not hardened documents, but as part of the evaluation flow are subject to revision and modification.

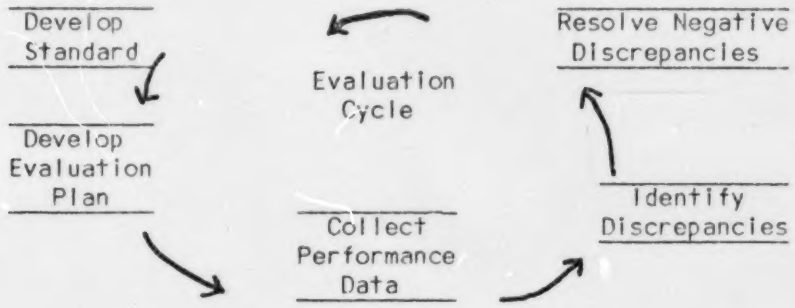

Figure 2

The evaluation cycle will become clearer as a closer look is taken at each evaluation stage in relation to simulation/gaming.

EVALUATION STAGES AND ILLUSTRATION

Pre-Design Evaluation

The purpose of this evaluation stage is to determine the appropriateness of simulation/gaming as the method of instruction given specified objectives.

The Standard and Evaluation Plan developed can serve as a model for any simulation/game.

STANDARD		
INPUT	PROCESS	PRODUCT
- An instructional problem	- Specify objectives in behavioral terms	- Instructional Objectives
- Knowledge of the operational educational system	- Relate the operational system to the problem	- Rationale for why alternate method of instruction is needed

The evaluation criteria are based on a review of the literature on simulation. From this review, it can be concluded that:

1. Simulation games are interesting to participants (Cruickshank, 1972; Abt, 1970; Taylor & Walford, 1972; Cherryholmes, 1966).
2. Simulations are neither more nor less effective than traditional methods in teaching factual information or conceptual knowledge (Cherryholmes, 1966; Heinkel, 1970; Fuller, 1973; Stadsklev, 1973; Coleman, et al, 1973).
3. Simulations can influence participant attitudes and values in a given direction (Heinkel, 1970; Fuller, 1973; Stadsklev, 1973; Coleman, et al, 1973).
4. Simulations are most effective when they are used for training purposes, and as a result of the simulation, the participant is expected to perform a specific task in a specific manner (Elder, 1973; Coleman, et al, 1973).
5. The effectiveness of a simulation for producing changes in attitude or behavior depends on the degree to which it requires the participant to employ knowledge or skills related to that attitude or behavior (Coleman, et al, 1973; Elder, 1973).

EVALUATION PLAN

Concern	Question	Measurement Instrument	Criteria
- Appropriateness of simulation/ game as method of instruction	- Are the stated instructional objectives compatible with the strengths of simulation instruction?	- Checklist	The stated instructional objectives include at least one of the following: - Influencing participant values and attitudes in a given direction - Training participants to perform a specific task in specific manner

If a negative discrepancy results, either the instructional objectives should be reformulated (change the standard) or an alternate method of instruction selected (terminate).

Design Evaluation

Design evaluation presents a framework for developing the simulation and checking to ensure that before a large investment is made in the simulation/ game, it meets the criteria for a "good" simulation. This evaluation stage permits revision of the simulation/game prior to the expenditure of resources involved in activities such as field-testing.

STANDARD

INPUT	PROCESS	OUTPUT
- Behavioral objectives appropriate for simulation as instructional method	- Determine simulation criteria - Generate criteria methods (instruments, if appropriate) - Determine specifications for simulation - Develop simulation prototype	- Simulation prototype

The author has selected two evaluation concerns for the design stage. The first concern is ensuring that an appropriate type of simulation has been developed given the developer's intended audience for the simulation. The second concern is to ensure that the simulation has face validity.

EVALUATION PLAN

Concern	Question	Measurement Instrument	Criterion
- Appropriateness of type of simulation developed	- Can the type of simulation/game be justified	- Twelker's (1969) Chart (See Appendix I)	- Given the developer's intended audience and instructional purposes, the advantages of the chosen format outnumber the disadvantages
- Face validity	- How do subject matter specialist rate the initial value of simulation?	- Simulation Rating Scale (See Appendix II)	- For each defined variable, at least 80% of the specialists view the simulation as adequate

The chart developed by Twelker (1969), and included as Appendix I, serves as a useful guide in classifying the type of simulation developed, as well as assessing the advantages and disadvantages of the selected format against the developer's goals and objectives for an intended audience. For example, one simulation/game classification defined by Twelker is the machine or media-ascendent simulation. This type of simulation is characterized by the instructional burden being carried largely by media such as slide tapes, films, computer output or programmed instruction. Advantages of this type of simulation as described by Twelker include: (1) reproducibility is easily obtained; (2) a large amount of control (planned variation) is possible; (3) visual stimuli are appropriate; (4) the simulation can be used where learners possess low

entry skills and l mited response repertories; (5) minimal teacher participation is required; and (6) learning objectives are generally congruent with standard course objectives. Disadvantages include: (1) such simulations are generally difficult to construct; (2) interact on between learners is quite difficult to incorporate; (3) feedback mechanisms may be costly and not easily done; and (4) peer feedback is difficult to obtain. The developer of a media-ascendent simulation would have to determine if given his intended audience for the simulation and his instructional goals and objectives, the advantages of a media-ascendent type simulation "outweigh" the disadvantages. If a negative discrepancy results from the comparison, alternatives would include redesign of the simulation format or termination of the effort.

Review of the literature indicates that at least 8 concepts are important in determining the face validity of a simulation:

1. Instructional Value. As discussed, Elder (1973) states that simulation used for the purposes of teaching general principles and concepts is less practical, less efficient, and more difficult than simulation for skill training. Twelker (1969) agrees that simulation is not a particularly efficient method of instruction for the teaching of cognitive or factual knowledge. Simulations, as previously indicated can, however, influence participant attitudes and values in a given direction, and are an effective instructional method when used for training purposes.

2. Credibility. This concept refers to the believability of the simulation; it may be thought of as analogous to realism. To ensure credibility, Elder (1973) states that the designer must have taken cognizance of the experience and capabilities of the participants. Stoll and Livingston (1973) indicate that realism in reference to a simulation refers to the combination of 3 specific qualities -- validity, comprehensiveness, and verisimilitude. These 3 qualities will be used to determine credibility.

2a. Validity. According to Stoll and Livingston, a simulation is valid to the extent that it accurately represents those aspects of the real situation that it is intended to simulate.

2b. Comprehensiveness. According to these authors, a simulation is comprehensive if it includes all the important aspects of the real situation and simulates them in sufficient detail.

2c. Verisimilitude. A simulation has verisimilitude if it gives participants a feeling of being in the real situation.

3. Symmetry. Both Elder (1973) and Gillespie (1972) regard symmetry as an important quality of simulations. It is thought that simulations which tend to place participants in structurally different situations or roles, exposing them to very different stimuli, produce mixed results in terms of participant learning.

4. Synchronization. Elder (1973) recommends that a simulation have a single referent time frame and uniform time-reckoning. Gillespie (1972) indicates that effectiveness will be impaired unless activities are sequenced so that participants have time to consider the major learning aspects of the game.
5. Manageability. Abt (1970) states that the task a participant is asked to perform at any point in time must be limited but consequential to the outcome of the exercise. Elder (1973) specifically urges that if the learning objectives are multiple, manageability must be achieved through a progressively developing simulation where new elements are introduced and the environment changed or enriched as the simulation proceeds. Newhouse (1974) also feels that progression is necessary to establish a complex repertoire.
6. Ease of Administration. Demands on the administrator of the simulation should be minimal according to Elder (1973); so that she/he may be free to observe the action.
7. Immediacy of Feedback. Taylor and Walford (1972), Elder (1973), and Newhouse (1974) emphasize the desirability of immediacy in terms of feedback to participants.
8. Learning Objectives. Twelker (1969), Elder (1973), and Taylor and Walford (1972) agree that a statement of general learning potential attributable to the simulation is not sufficient. These authors state that learning

objectives should be student-oriented, clearly stated at the outset, and carried through within the simulation. The objectives should clearly answer the question: What is the participant to know, understand, appreciate, or be able to do as a result of the exercise?

These 8 concepts can be used to determine the face validity of a simulation. An example of their use as criteria in a rating scale is provided as Appendix II. Naturally this scale would need to be adapted to the developer's specific simulation.

Input/Process Evaluation

Input/Process evaluation presents a framework for checking to ensure that the simulation has been installed or administered as planned, and that the enabling (interim objectives of the simulation that "enable" obtainment of terminal objectives) have been achieved. The need for this evaluation stage is well-put in several analogies offered by Plummer (1976). "In the process of enacting a simulation/game the simulation director hitches the mobile home to the forces he controls and starts moving it ot its intended destination. High winds of change may easily reduce the structure to matchsticks (p. 6-7)." Plummer (1976) continues: "...the simulation director tries to arrive at a new location while his visitors, or simulation participants, are inside the structure, attempting to negotiate its labyrinth of hallways, corridors, and blind alleys while the dwelling is in motion (p. 7). Thus, this evaluation stage provides a framework for observing the enactments, or in other words, it provides for evaluation of the simulation operating. Resulting information provides a basis for modification of the simulation and/or its administration prior to any summative judgment concerning the effectiveness of the simulation in meeting its terminal (end) objectives.

Initially input/process evaluation may be thought of as the operative "debugging" stage. While practically input/process evaluation may involve one cycle, ideally its end would be indicated when after several evaluation cycles have been completed, replication of the simulation is assured, at least the accomplishment of enabling objectives. The illustrations of a standard and evaluation plan for the input/process stage involve a media/ascendent simulation which relied heavily on the medium of programmed instruction. The simulation consisted of 10 separate but related parts with each part having specific interim or enabling objectives. Each interim objective was related to the achievement of one or more terminal objectives. Thus the achievement of terminal objectives was dependent on the achievement of the enabling objectives. The standard and evaluation plan which follow were developed for one of the 10 parts of the simulation.

STANDARD (TASK SEVEN)

INPUT	PROCESS	OUTPUT (Enabling Objectives)
- Instructor - Students who have completed Tasks One through Six of the simulation - Task Seven of the simulation - 45-minute time period	7.1 Students read objectives for Task Seven 7.2 Students read the Scenario for Task Seven 7.3 Students read Task Seven objectives 7.4 Students complete and score an exercise requiring identification of levels of specificity of variables 7.5 Students continue the Task Seven Scenario 7.6 Students continue the Instructions 7.7 Students complete and score an exercise requiring identification of appropriate measurement modes 7.8 Students complete Task Seven feedback forms 7.9 Instructor provides assistance as necessary	- Students identify levels of specificity of variables - Students identify proper measurement modes for variables

EVALUATION PLAN (TASK SEVEN)

Concern	Question	Measurement Instrument	Criterion
Administration	- How much time is needed to complete the task?	Task Completion Log	45 minutes
	- Do all students complete the task?	Task Completion Log	all students complete the task
Adequacy of Materials	- Were the instructions for the task clear?	Task Feedback Form	at least 80% of the students agree that the instructions are adequate
	- Was the difficulty level of the task appropriate?	Task Feeback Form	at least 80% of the students view the difficulty level of the task as appropriate
	- Was the content of material for the task sufficient preparation for task response?	Task Feeback Form	content of material for each of the task is viewed as sufficient for task response by at least 80% of the students
Enabling Objectives	- Can students identify levels of specificity of variables?	Variable specificity response form	Students obtain a score of at least 80% correct on the exercise
	- Can students identify proper measurement modes for variables?	Measurement mode response form	Students obtain a score of at least 80% correct on the exercise

These illustrations are not meant to of delineate all possible evaluation concerns or questions. They do indicate, however, the need for formative evaluation of a simulation. It is obvious that many difficulties (e.g. adminstrative problems, inadequacy of materials, lack of attainment of enabling objectives) may lead to the situation where a simulation is prematurely judged ineffective in a summative evaluation. These difficulties are, in fact, often remediable. If, for example, the 45-minute time

period in the illustration is not sufficient time for the task, the simulation developer can either change the standard and increase the time alloted for the task or control performance by cutting task activity to the point where it realistically can be completed in 45 minutes. If this problem were not identified however, and time limits were enforced, an enabling objective of the simulation would not be achieved, thereby lessening the probability that terminal objectives would be met.

Output Evaluation

In this evaluation stage, a framework is presented for conducting a summative evaluation of the simulation. The purpose of this evaluation stage is assessment of the simulation at its simplest level. This stage builds on the foundation provided in particular by input/process evaluation and determines the degree to which the terminal objectives of the simulation have been achieved. A more sophisticated investigation would take the polished simulation and apply experimental or quasi-experimental designs in order to infer causation. In such designs, the relationships between the simulation activities and the accomplishment of interim objectives can often be translated into independent variables for investigation. Recent examples of quasi-experimental designs applied to the evaluation of simulation games have been offered by Rader (1976) and Anderson (1977).

The illustrations of a standard and evaluation plan for the output evaluation stage use the same media-ascendent simulation presented in previous examples.

STANDARD

INPUT	PROCESS	OUTPUT (Terminal Objectives)
Instructor - familiar with the simulation - knowledgeable in terms of evaluation methodologies Students (10-15 in number) - Graduate students in education - No previous formal evaluation training Materials - 10-15 copies of simulation Facilities - Room with large tables Time - Total of 10 hours	1.0 Students complete Task 1 2.0 Students complete Task 2 3.0 Students complete Task 3 4.0 Students complete Task 4 5.0 Students complete Task 5 6.0 Students complete Task 6 7.0 Students complete Task 7 8.0 Students complete Task 8 9.0 Students complete Task 9 10.0 Students complete Task 10	- Students increase knowledge of evaluation methodology - Students enlarge their concept of evaluation - Students increase willingness to engage in formal evaluation procedures - Students demonstrate ability to apply evaluation techniques by providing a program design and evaluation plan which meet predetermined criteria

EVALUATION PLAN

CONCERN	QUESTION	MEASUREMENT INSTRUMENT	CRITERION
Simulation effectiveness	Having completed the simulation, can students apply the evaluation techniques?	Product Scoring System	Students produce a program design and evaluation plan which meet predetermined criteria and obtain scores of at least 70% correct
	By completing the simulation, do students increase in knowledge of evaluation methodology?	Evaluation Knowledge Test	Students increase significantly (ANOVA) in knowledge of evaluation as demonstrated by scores on a pre and post-test measure
	Having completed the simulation, do students' concepts of evaluation change?	Evaluation Attitude Questionnaire (excluding item #4 & #7)	Students' concept of evaluation broadens as demonstrated by a significant difference (ANOVA) between pre and post-test scores on a measure of concept of evaluation
	Does students' willingness to use formal evaluation procedures increase?	Items #4 & #7 of the Evaluation Attitude Questionnaire	Students demonstrate a significant increase (ANOVA) in willingness to use formal evaluation procedures as evidenced by a significant difference between pre and post-test scores

In conclusion, discrepancy evaluation provides a framework for the improvement of a simulation as well as assessment of the effectiveness of a simulation. The evaluation can be as simple or complex as indicated by the needs of the simulation developer. It can be informal or formal depending on the audience(s)

for the information. The advantages of discrepancy evaluation include:

- providing a framework for ensuring adequate planning of the evaluation;
- allowing the identification and resolution of problems prior to the investment of large resources in the simulation;
- enabling simulation improvement prior to assessment of simulation effectiveness;
- serving as a guide to implementation of the simulation; and
- providing documentation of the evaluation.

Finally, discrepancy evaluation permits both the evaluation of a simulation still in developmental stages and evaluation of effectiveness of the polished simulation.

*APPENDIX I

Advantages of Each Type of Simulation

FACTOR	TYPE OF TECHNIQUE: INTER-PERSONAL ASCENDENT SIMULATION	MACHINE/ MEDIA ASCENDENT SIMULATION	NON-SIMULATION GAME
1. Control (reproducibility) desired	Questionable	Good	Difficult
2. Control (planned variation) desired	Questionable	Very good	Good
3. Input must be machine mediated, e.g., visual stimuli required	Not easily adopted	Appropriate	Not easil adopted
4. Psychomotor and perceptual learning involved	Questionable	Very good	Question-able
5. Learners possess low entry skills & limited response repertories that prevent an interpersonal-ascendent simulation from functioning	Limited value	Useful	Question-able
6. Teacher control over class required	Not so good	Very good	Fair
7. Simple and inexpensive technique desired	Good	Not easily done	Very good
8. Interaction between learners required	Very good	Possible but costly	Good
9. Burden of simulation experience on learner required	Good	Possible	Possible
10. Model that emphasizes human interaction involved	Very good	Not easily done	Question-able
11. Individual differences must be considered but expensive to implement	Good	Not easily done	Good
12. Feedback must be easily designed into system	Good	Sometimes costly and difficult	Good
13. Feedback must come from peers	Good	Difficult	Good
14. Easy development process required	Sometimes difficult	Sometimes difficult	Very good
15. Insertion into curricula must be easy	Sometimes difficult	Sometimes difficult	Very good
16. Must be generally acceptable	Sometimes difficult	Good	Very good
17. Few learners involved	Limited	Good	Very good
18. Learning objectives congruent or identical to standard course objectives	Limited	Good	Very good

*Twelker, Paul A. "Designing Simulation Systems." Educational Technology, October, 1969, p. 69.

APPENDIX II

[SIMULATION RATING SCALE]

I. Check the appropriate box.

1. A simulation is comprehensive if it includes all the important aspects of the real situation and simulates them in sufficient detail. The primary audience for this simulation is prospective or working public school staff. Rate A Simulation in Educational Evaluation for comprehensiveness of its evaluation coverage in relation to the needs of its intended audience.

( )	( )	( )	( )	( )
Serious Comprehension Weaknesses				Extremely Comprehensive

Comments:

2. A simulation has verisimilitude if it gives the participants a feeling of being in the real situation. Rate A Simulation in Educational Evaluation on verisimilitude.

( )	( )	( )	( )	( )
Weak in Verisimilitude				Strong in Verisimilitude

Comments:

3. A simulation is valid if it accurately represents those aspects of the real situation that it is intended to simulate. Rate A Simulation In Educational Evaluation for validity in terms of its representation of an evaluation of a Title III program for the gifted.

( )	( )	( )	( )	( )
Weak in Validity				Strong in Validity

Comments:

4. When learning objectives are multiple, manageability should be achieved through a progressively developing simulation. Rate A Simulation in Evaluation for manageability.

( )	( )	( )	( )	( )
Low Manageability				High Manageability

Comments:

5. A simulation should be easily administered in that it frees the instructor, to the maximum extent possible, to observe participants. From your examination of the simulation, rate A Simulation in Educational Evaluation for ease of administration.

( )	( )	( )	( )	( )
Difficult to Administer				Easy to Administer

Comments:

6. A simulation has symmetry if it does not place participants in structurally different situation or roles throughout the simulation. Rate A Simulation in Educational Evaluation on its symmetry.

( )	( )	( )	( )	( )
Weak In Symmetry				Strong In Symmetry

Comments:

7. A simulation should contain learning objectives that are student-oriented, clearly stated at the outset, and carried through within the simulation. Rate A Simulation in Educational Evaluation on the adequacy of its learning objectives according to the above criteria.

( )	( )	( )	( )	( )
Poor Learning Objectives				Excellent Learning Objectives

Comments:

8. Immediacy of feedback to participants is desirable in simulations. While computer simulations most obviously ensure immediacy of feedback, in any simulation effort can be made in this direction. Rate A Simulation in Education Evaluation on immediacy of feedback.

( )	( )	( )	( )	( )
Weak in Immediacy of Feedback				Strong in Immediacy of Feedback

Comments:

9. A simulation has synchronization if it uses a single referent time frame. Rate A Simulation in Education Evaluation on synchronization.

( )	( )	( )	( )	( )
Low Synchronization				High Synchronization

Comments:

10. Rate the instructional value of A Simulation in Educational Evaluation.

( )	( )	( )	( )	( )
Low				High

Comments:

11. Please use this space for any additional comments concerning A Simulation in Educational Evaluation.

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